A Comparison of No Till and Conventional Tillage Systems on Twelve White Bean Varieties

Chris Gillard, Ridgetown College, University of Guelph, Ontario

Abstract

Since the mid 1990's, farmer interest in no till planting methods in Ontario has growing exponentially for most field crops, including white beans (Phaseolus vulgaris L.). However very little data exists on the performance of various white bean varieties under no till conditions, since white bean variety performance testing in Ontario is typically done using conventional (moldboard plow) or conservation tillage practices. The purpose of the study was to determine the response of 12 popular Ontario white bean varieties under two different tillage systems; no till and conventional tillage. From 1994-96, field experiments were set up in Huron and Perth Counties in southwestern Ontario. Each year, one experiment was located at an established no till site, with a minimum of 4 years continuous no till, while a second experiment was located at a neighboring site, with a minimum of one year of conventional tillage. The site for the second experiment was carefully selected to have the same previous crop, and similar soil conditions. The previous crop in all cases was field corn. At each experimental site, replicated blocks of no till and conventional (moldboard plowing) tillage were set up to create two tillage systems comparisons; first year no till versus conventional tillage, and established no till versus conventional tillage. A John Deere model 750 drill was used to plant the 12 white bean varieties in 38 cm rows. All selected varieties had above average yield performance, but differed in relative maturity and plant type. In 1994, emergence was significantly better in the no till system for all varieties, due to dry soil conditions at planting and a prolonged dry period after planting. There were no differences in emergence between tillage systems for any variety in 1995 or 1996. Final plant populations were slightly lower in the no till system, although final plant populations rarely dropped below the minimum target population of 350,000 plants per hectare. This was not a concern, since edible beans typically compensate for small decreases in plant population. Most of the varieties were slightly shorter (2-3 cm) and matured slightly later (1-2 days) in the no till system, which agrees with similar work in other crops, such as soybeans. Yields were slightly lower in the no till system for most varieties, compared to a conventional tillage system. However, this yield decrease is often small, and was usually less than 100 kg ha^{-1}. The decrease in tillage and labour costs associated with the no till system would more than compensate for the slight yield decrease. Compared to a conventional, moldboard plow, tillage system, planting white beans in a no till system is feasible, and plant type or maturity of a variety has very little effect on overall performance in a no till system.